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Medical Comorbidity in Patients with Schizophrenia and Alcohol Dependence

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1. Introduction

1.1. Background

Over one-third of patients with schizophrenia have an alcohol use disorder (AUD), and the prevalence of AUD is 3.3 times greater compared to the general population (Regier et al., 1990, Green and Brown 2006). Schizophrenia and AUD are each, independently, major risk factors for a wide variety of medical problems, yet few systematic reports are available describing the medical comorbidity that accompanies the co-occurrence of schizophrenia and AUDs (Dickey et al., 2002).

It has been estimated that more than 50% of patients with schizophrenia have another medical diagnosis (Mitchell and Malone, 2006). Medical problems may be related to a variety of factors including the cognitive and behavioral impairments associated with schizophrenia itself as well as the adverse effects of the medications used in its treatment (Goldman, 1999; Sokal et al., 2004). There are high rates of diabetes (Dixon et al., 1999, Muir-Cochrane 2006), hyperlipidemia, obesity (Goff et al., 2005), chronic obstructive pulmonary disease, cardiovascular disease (notably hypertension) (McCreadie, 2003), hepatitis, and HIV infection. Advanced age, female gender, depression and neurocognitive impairment are all associated with an increased burden of comorbid medical illness in schizophrenia (Chwastiak et al, 2006). Undertreatment of hypertension, diabetes and dyslipidemia, and the combined “dual neglect” of chronic medical conditions by both patients and health care providers also contribute to increased illness burden in schizophrenia (Meyer and Nasrallah, 2003, Nasrallah et al., 2006).

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Alcohol use disorders (AUDs) are also associated with medical morbidity (Liskow et al., 2000, De Alba et al., 2004). Excessive alcohol use increases the likelihood of developing a range of medical problems affecting the nervous and gastrointestinal systems in particular, but also harming the hemopoietic, cardiovascular, genitourinary, musculoskeletal and endocrine systems (Shuckit, 2005). Heavy alcohol use is also associated with increased risk of various types of malignancies, particularly head and neck cancers.

Patients with schizophrenia, who have an earlier age of onset and better premorbid characteristics are more likely to have alcohol problems. (Mueser et al., 1992) Alcohol abuse may start before the onset of psychosis, but the opposite can also be true: patients with psychosis may start to use alcohol to relieve anxiety.

Increased knowledge of the medical consequences of comorbid schizophrenia and AUD could potentially help clinicians to provide more effective treatments to reduce harm and improve quality of life in patients with these disorders. It may also help researchers to design and conduct safer clinical trials, particularly when studying pharmacological treatments for alcohol dependence in schizophrenia.

1.2. Objectives

This report describes the prevalence of medical disorders and severity of medical illness burden in a research cohort of patients with schizophrenia or schizoaffective disorder and co-occurring AUDs. It also describes the medications used by these patients, the presence of primary care, and inpatient and emergency department utilization patterns. Finally, it describes the relationships between medical illness and demographic variables, alcohol and other substance use, and severity of psychosis.

2. Methods

2.1. Participants

This report covers the first 80 participants enrolled in a National Institute on Alcohol Abuse and Alcoholism (NIAAA)-funded, controlled trial of directly monitored naltrexone treatment for alcohol dependence in schizophrenia (Batki, et al, 2007).

Participants were outpatients with a DSM-IV (Diagnostic and Statistical Manual of Mental Disorders, fourth edition, text revision) diagnosis of schizophrenia or schizoaffective disorder between the ages 18 to 65, who were recruited from community mental health clinics in Syracuse, New York and provided informed consent. All patients met DSM-IV criteria for alcohol dependence or abuse and had at least four days of drinking in the 30 days prior to enrollment. Patients were referred by mental health providers (therapists, nurses and psychiatrists). Patients also contacted research staff directly to seek study entry.

All participants were confirmed to be prescribed antipsychotic medications by their clinical treatment providers. Data were collected from November 2003 to August 2007.

Patients were excluded from the study if they were unable to provide informed consent, if they were receiving pharmacotherapy for alcohol dependence, or if they were using any prescribed or non-prescribed opioids. Patients who were pregnant or nursing were excluded, as were female patients of childbearing potential who were not using birth control. Patients were excluded if they had an AST (aspartate aminotransferase) level greater than 3 times the upper limit of the normal range. Patients in need of acute medical detoxification from alcohol, and those with surgery scheduled within 3 months were also excluded.

2.2. Procedures

We analyzed baseline data from the screening phase of the parent study.

2.3. Measures

2.3.1. Assessment of medical status and medical illness burden—Medical history and physical examination were performed by a study physician or nurse practitioner. Laboratory tests included complete blood count (CBC), and comprehensive metabolic panel. Baseline medications, medical diagnoses and medical utilization data (hospitalizations and emergency department [ED] visits over 6 months prior to enrollment) were determined by a review of medical records (outpatient mental health clinic charts and emergency and inpatient discharge summaries from all local hospitals in the Syracuse metropolitan area).

The following assessments of medical illness severity were scored by a research physician (ZM or RD):

1. The Charlson Comorbidity Index (CCI) (Charlson et al. 1987) provides severity ratings for 17 common medical conditions, each of which is assigned a weighted value (Nuttall et al. 2006). The patient's age is also incorporated into the CCI score. This system has been used extensively as a measure of co-morbid illness severity.
2. Cumulative Illness Rating Scale - Substance Abuse Version (CIRS-SA) was also calculated. This scale assesses impairment in 13 categories, each one scored from 0 (no impairment) to 4 (highest possible impairment). (Castillo et al., 2004). In contrast to the Cumulative Illness Rating Scale (CIRS) for Geriatrics (Parmelee et al., 1995), the CIRS-SA version does not include psychiatric illness severity, but adds infections and HIV status. The total CIRS score has been shown to be valid and reliable and able to predict mortality and the use of medical resources.
3. Number of medical diagnoses was calculated by one of the study physicians.
4. Number of medical ER visits and medical hospitalizations during the 6 months prior to enrollment in the study were determined by review of medical records from all Syracuse hospitals.

2.3.2. Measures of alcohol and substance use—Alcohol and substance use were assessed with biological measures -- serum gamma-glutamyl-transpeptidase (GGT), and serum aspartate aminotransferase (AST), self-report -- the alcohol composite score portion of the Addiction Severity Index (ASI) (McLellan et al. 1992), Timeline Follow-Back (TLFB) (Sobell et al., 1985), and diagnostic interview with the Structured Clinical Interview for DSM-IV (SCID) (First et al., 2001).

2.3.3. Measures of severity of psychosis—Schizophrenia symptoms were assessed by the Positive and Negative Syndrome Scale (PANSS) (Kay et al. 1987.) Interviewers were certified by the PANSS Institute. Psychiatric medications, number of psychiatric hospitalizations, and number of emergency department visits in the 6 months prior to enrollment were also recorded. Diagnosis of schizophrenia versus schizoaffective disorder was determined using the SCID. Depression was assessed with the Calgary Depression Scale for Schizophrenia [CDSS] (Addington et al., 1993). Global Assessment of Functioning (GAF) score was also determined (Luborsky 1962 and Endicott et al., 1976).

2.3.4. Demographic data—Baseline demographic data included age, gender, race, ethnicity, monthly income, level of education, employment status, monthly income, marital status, living arrangements, number of children and absence or presence of primary care physician.

2.3. Statistical Analyses

Statistical analyses were performed using Statistical Package for Social Sciences, version 15 (SPSS Inc., Chicago). All tests employed two-tailed alpha =.05. Nested block multiple regression analyses were evaluated the combined and independent variance contributions of various predictors on medical illness severity. We conducted separate analyses for two of the medical illness severity measures: the CCI and CIRS-SA. A block of demographic variables (Age, gender, race [white, non-white], monthly income, employment, education, number of children and presence (or absence) of primary care physician) were entered into the initial regression predicting medical illness severity. We then entered a block of predictors describing non-alcohol substance use severity (number of days of cocaine and cannabis use in the past 30 days and number of cigarettes /week). Next, we entered a block of alcohol use severity predictors (number of drinking days per week, number of drinks per week, ASI alcohol composite score, and AST and GGT levels at baseline, and duration of alcohol problems). The final block of predictors entered into the model assessed psychosis severity (PANSS positive, PANSS negative and PANSS general score, GAF score, Calgary score, number of psychiatric ER visits and psychiatric hospitalizations, number of psychiatric medications, duration of psychiatric problems, onset of psychosis relative to drinking problems and schizophrenia vs. schizoaffective diagnosis). Thus, four blocks of predictors were entered in a nested fashion in which each successive block contained all predictors in the prior block, plus new predictors from the current block, with significance tests to establish whether the new block of predictors made a significant improvement to the prior model. At each step, we interpreted the multiple R^2 and associated p-values as an evaluation of the overall model, but more importantly we compared each model to the prior (reduced) model by comparing the amount of unexplained variance in either model using Analysis of Variance (ANOVA), with the overall goal to reduce unexplained variance. In this way, we established whether the larger construct for each of four blocks of predictors (demographic variables, non-alcohol substance use severity, alcohol use severity, psychosis severity) contributed significantly to medical severity outcomes (CCI and CIRS-SA). Ultimately, we interpreted only the multiple regression models that represent a significant improvement in the prior model (by significantly reducing unexplained variance); we do not interpreted complex models that include predictors that, as a block, fail to reduce unexplained variance over the prior nested model.

After establishing the significance of blocks of related predictors, we report significance of individual predictors in the resultant model for CIRS-SA and Charlson scores. Specifically, we report standardized beta coefficients and associated p-values, as well as squared semi-partial correlation coefficients (sr^2) as a measure of predictors' unique variance contributions.

3. Results

3.1. Descriptive statistics

Demographic data, psychiatric diagnoses and symptom severity, alcohol and substance use are summarized in Table 1. The majority of participants were middle aged, male, non-Caucasian, single, low-income, unemployed and supported on welfare or disability payments. Slightly more than half were diagnosed with schizophrenia, the remainder with schizoaffective disorder. The onset of psychiatric illness preceded the onset of alcohol abuse/dependence in 62.5% of the participants (50 patients).

Alcohol use disorder consisted of dependence in 95% and abuse in 5% of participants. PANSS positive and negative symptoms were relatively low compared to the inpatient standard used as a normative group in PANSS manual (Kay et al, 2006). Mean GAF score reflected some impairment of reality testing or communication, or major impairment in several areas of functioning such as work or school, family relations, judgment, thinking or mood. Baseline

week alcohol use averaged 4 days and nearly 11 drinks per drinking day. Eighty-six percent of participants smoked; 54% used cannabis, and 31% used cocaine in the past 30 days.

Medical care utilization is presented in Table 2. Over 77% of the sample reported having a primary care physician, 4% had a medical hospital admission in the 6 months prior to study entry and 29% had a total of 43 ER visits for medical reasons.

Table 3 summarizes medical diagnoses. Eighty-two percent of participants had at least one medical diagnosis and more than half were diagnosed with three or more medical conditions. The average number of diagnoses was 2.9. The most frequent medical conditions were hypertension (43%), gastroesophageal reflux disease (26%), asthma (24%), hyperlipidemia (21%), osteoarthritis (21%), back pain (13%) and diabetes mellitus (10%).

Laboratory examination revealed that complete blood count was abnormal in 23% and complete metabolic panel had abnormal results in 31% of participants. AST, ALT and GGT values were in the normal range in most participants (AST mean was 29.8, SD: 17.0; ALT mean: 35.4, SD: 28.5; GGT mean: 68.1, SD: 107.9).

The majority (64%) of patients (n=51) were receiving non-psychiatric medications, most frequently antihypertensives (in 30% of participants), analgesics (26%), antacids (23%), asthma medications (18%) and lipid lowering agents (16%). Only 24 (71%) of the 34 patients with high blood pressure were receiving antihypertensive medications. Hyperlipidemia was present in 17 patients (21%), and 13 of these (76%) were receiving lipid lowering medications (see Table 4).

All participants were prescribed antipsychotics, with 73 patients (91%) taking atypical agents, of whom 26 (33%) were prescribed more than one atypical antipsychotic. Thirty-three percent were also prescribed lithium or other mood stabilizers. 44 patients (55%) were also taking antidepressants, of whom 12 (15%) were taking more than one antidepressant medication.

3.2. Block regression analyses

Table 5 summarizes the results of the block regression analyses evaluating the combined and independent significance of blocks of related predictors including (1) demographic characteristics, (2) non-alcohol substance use severity, (3) alcohol use severity variables, and (4) psychosis severity. Outcomes included two measures of medical illness burden (CIRS-SA, Charlson Comorbidity Index), and the blocks of potential predictive variables included demographics (age, gender, race, monthly income, education, employment, presence of PCP and number of children), non-alcohol substance use severity (cocaine use, cannabis use, smoking), alcohol use severity (AST, GGT, number of drinking days, number of drinks, ASI alcohol composite score, duration of alcohol problems) and psychosis severity (PANSS positive, negative and general score, GAF score, number of psychiatric hospitalizations, number of psychiatric ER visits, number of psychiatric medications, psychiatric diagnosis, Calgary score, duration and onset of psychiatric illness relative to AUDs). Our analysis evaluated whether each successive block of predictors contributed a significant amount of predictive variance or not, resulting in a final model that includedall blocks of predictors that improved prior models significantly. Individual predictors' significance are also evaluated and presented below.

Results indicated that demographics, substance use and alcohol use severity blocks each made significant improvements in the models in explained variance using CIRS-SA as an outcome, however the addition of psychosis severity variables did not produce significant improvement. Table 5 shows the final models predicting these outcomes, with beta coefficients and significance levels provided for each predictor. Excluded variables are shaded in gray.

The effect of addiction severity, alcohol severity or psychosis severity as a block on Charlson comorbidity index was not significant. Demographics as a block ($p<0.001$), especially advanced age and presence of primary care physician, were significantly associated with increased medical illness burden.

The number of medical ER visits ($\beta=0.634$, $p=0.009$) and Charlson comorbidity index ($\beta=0.331$, $p=0.003$) correlated with GGT -- a surrogate physiological marker for alcohol use severity -- after correcting for confounding demographic and addiction severity variables. The number of total medical diagnoses also correlated with GGT ($\beta=0.409$, $p=0.049$). Patients with schizoaffective disorder had more medical diagnoses than patients with schizophrenia ($\beta=0.350$, $p=0.030$) after correcting for demographic variables, and alcohol and substance use.

Interpretations of the squared semi-partial correlation coefficients revealed that the predictors that made the largest unique variance contributions after factoring out shared variance were presence of PCP for the CIRS-SA outcome ($sr^2=0.047$), age for the Charlson comorbidity index ($sr^2=0.198$).

4. Discussion

The goal of this report was to characterize the type and severity of medical comorbidity in patients with schizophrenia and co-occurring alcohol dependence and to examine the influence of demographic factors, psychiatric illness severity, alcohol use severity and non-alcohol substance use severity on medical illness burden. Over 80% of our sample had a form of chronic medical illness, with the most frequent being hypertension, GERD, asthma and hyperlipidemia. These findings are consistent with the recognition that hypertension is associated with not only alcohol use and schizophrenia, but cocaine use as well. Hyperlipidemia is associated with schizophrenia and antipsychotic use, and GERD is known to be related to alcohol use. Comparing our sample to that of the CATIE trial, (Chwastiak L. et al., 2006) medical illness burden appears to be markedly higher in our cohort of patients with both schizophrenia and alcohol dependence than in CATIE patients with schizophrenia only. The patients enrolled in the CATIE trial had a mean of only 2.2 medical conditions. The average number of medical diagnoses was 2.9 in our dual-diagnosis sample. Furthermore, the point prevalence of hypertension was more than 2 times higher (43% vs. 20%), hyperlipidemia was 1.5 times more prevalent (21% vs. 14%), and osteoarthritis was more than 4 times more prevalent. Several other medical conditions were substantially more prevalent in our sample: e.g. asthma (24% vs. 3%), COPD (8% vs. 2%), coronary artery disease (6% vs. 1 %), and HIV (4% vs. 1%). The rates of diabetes (10% vs. 11%) and hepatitis C (6% vs. 4 %), however, were similar.

Our findings are in distinction to the CATIE analyses, which did not find increased medical morbidity associated with alcohol and drug abuse in their cohort. Possible explanations for this difference between our trial and the CATIE trial include the following: 1.) In contrast to the CATIE trial, in our study every patient had a comorbid alcohol use disorder diagnosis (generally alcohol dependence). 2.) We included patients with schizoaffective disorder 3.) Our sample size was much smaller (but our study is the largest one to date on patients with schizophrenia and comorbid alcohol use disorder). 4.) We reviewed medical records, and did not rely only on self report, as did the CATIE trial.

Regarding the determinants of medical illness burden, we found that illness burden is predicted by demographic factors (e.g age) and alcohol use severity (e.g. GGT), and is less influenced by psychiatric severity or other substance use.

The correlation between alcohol use severity and medical illness burden is mainly related to GGT levels, an objective measure of transaminase elevation possibly due to alcohol-related liver injury. Patient-reported alcohol and drug use severity was not significantly related to

medical severity. This raises the possibility that biological markers of alcohol use may be a more reliable or sensitive correlate of medical status than self-report in patients with schizophrenia.

The two main confounding factors were age and presence of a primary care physician (PCP). The Charlson comorbidity index is calculated based on the patient's age and number of medical diagnoses. This is problematic as severity of alcohol use and frequency of marijuana use decrease with age. It is therefore conceivable that a relatively healthy, moderately drinking participant who is elderly may obtain a worse Charlson index (due to age) than one who is heavier drinking, with multiple illnesses, but younger. The presence of a primary care physician is also a confounding variable, as the Charlson comorbidity index does not detect untreated hypertension, untreated hyperlipidemia, undiagnosed coronary artery disease or liver problems. Therefore, patients may have been more likely to receive a lower medical illness burden score if they did not have a PCP – not necessarily because they truly had fewer medical problems but possibly because they may not have received diagnoses or medications which would have been detected by the Charlson comorbidity index.

A strength of this study is that it included patients with schizophrenia and alcohol use disorders, many of whom also had other substance use, and the findings may therefore be generalizable to a large segment of “real world” patients with schizophrenia and comorbid AUD. Another strength is that the data on medical comorbidity and medical utilization did not rely exclusively on patient self-report, but rather, on a comprehensive review of medical records. Furthermore, standardized psychiatric, substance use, and medical assessments were performed by trained medical and research staff. This study also has limitations, most notably its cross-sectional nature and a cohort of limited size. Moreover, it is important to note that the medical illness severity measures used were not particularly sensitive to alcohol-related medical problems. For example, laboratory abnormalities (e.g. liver function tests) are not included in these scales, and the scales also do not measure the severity of atherosclerosis, cognitive deficits, and neuropathy -- problems that are frequently related to alcohol use. There is therefore a need for better measures of medical illness burden for patients with mental illness and alcohol and substance use disorders. Such measures would not only be useful in clinical research, but could lead to improvements in treatment outcomes. Of the two measures of medical illness burden used in this study, CIRS-SA seemed to be more sensitive (it was able to detect the most significant correlations and was independent of age and psychiatric diagnoses). It also has the advantage of taking into account the severity of medical problems, not just the number of diagnoses and medications, like the Charlson Comorbidity Index.

Despite these limitations, the analyses revealed several findings regarding the clinical factors that contribute the most to medical illness burden and these findings may have important clinical implications. Among patients with schizophrenia or schizoaffective disorder and comorbid alcohol use disorders, a potentially modifiable risk factor -- alcohol use -- was associated with increased medical illness burden. Interventions to decrease alcohol use may therefore be critically important in reducing medical morbidity in this patient population. Our study also identified areas for future research, such as the need to compare the sensitivity, specificity and reliability of measures used to quantify medical illness burden in patients with severe mental illness and comorbid substance abuse.

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Table 1

Socio-demographic and clinical characteristics (N=80)

Demographics		
	Mean± SD	**Range**
Age (years)	42±9	22-59
Education (years)	11.7±2.5	7-21
	No.	**%**
Gender		
Male	58	72.5
Female	22	27.5
Race		
African American	31 (21males, 10 females)	38.8
Caucasian	36 (27 males, 9 females)	45
American Indian	2 (2 males)	2.5
Mixed/Other	11 (7 males, 4 females)	13.8
Ethnicity		
Hispanic	5 (4 males 1 female)	6.3
Non-Hispanic	75 (54 males, 21 females)	93.4
Employment Status		
Not currently employed	71 (50 males, 21 females)	88.8
Currently employed/Student	9 (8 males, 1 female)	11.25
Main Source of Income		
Employment	4 (4 males)	5
SSI/SSD	53 (37 males, 16 females)	66.3
Public Assistance	14 (9 males, 5 females)	17.5
Other	4 (4 males)	5
No income	5 (4 males, 1 female)	6.3
	Mean±SD	**Range**
Monthly Income (USD)	$676 ±353	0-$2400
	No.	**%**
Marital Status		
Married	6 (5 males, 1 female)	7.5
Never Married	52 (38 males, 14 females)	66.3
Other	22 (14 males, 8 females)	26.3
Living arrangements		
Independent	58 (41 males, 17 females)	72.5
Structured residence	14 (12 males, 2 females)	17.5
Living with family	7 (4 males, 3 females)	8.8
Homeless	1 (1 male)	1.3
	Mean±SD	**Range**
Number of children	1.3±1.8	0-6
Diagnosis and Duration of Symptoms (years)		

Demographics			
	Mean± SD		**Range**
	No.		**%**
Schizophrenia	44 (35 males, 9 females)		55
Schizoaffective Disorder	36 (23 males, 13 females)		45
Alcohol dependence	76 (56 males, 20 females)		95
Alcohol abuse	4 (2 males, 2 females)		5
	Mean±SD		**Range**
Duration of psychiatric illness	22.1±10.6		1-45
Duration of alcohol problems	18.4±10.7		0-41
Duration of schizophrenia	20.8±10.0		1-40
Duration of schizoaffective d/o	23.6±11.2		4-45
Schizophrenia Symptom Severity			
	Mean±SD		**Range**
GAF	39.9±6.8		30-60
	Mean±SD		**Median**
PANSS General score	32.4±7.1		32.5
PANSS Composite Score	1.7±7.5		2
PANSS negative symptoms	13.4±4.9		13
PANSS positive symptoms	15.1±5.2		14
Addiction Severity Index (ASI)			
Variables	**Mean±SD**		**Range**
Alcohol Composite score	0.5±0.2		0.1-0.9
Days of alcohol use in past 30 days	14.9±8.7		2-30
Days of alcohol use to intoxication in past 30 days	13.6±9.2		0-30
Time Line Follow-Back (TLFB) at baseline			
	No.		**%**
No. of subjects who used alcohol the baseline week	63 (47 males, 16 females)		78.8
	Mean±SD		**Range**
# drinking days per week	3.9±2.0		0-7
# drinks per drinking day	10.8±11.7		0.6-86.4
# drinks per week	40.0±36.8		1.2-161.9
# of heavy drinking days per week	2.7±2.3		0-7
Baseline self-reported substance use in past 30 days			
	No.	**%**	**# days in past 30 days (mean±S.D.)**
Cigarettes	69 (51m, 18f)	86.3	No data
Cocaine	25 (19m, 6f)	31.3	2.1±4.7
Cannabis	43 (30m, 13f)	53.8	6.2±9.7
Opiates	6 (3m, 3f)	7.5	0.6±3.5
Sedatives	8 (6m, 2f)	10	2.1±7.2
Methamphetamine	1 (1m)	1.3	1

Table 2

Medical utilization 6 months prior to enrollment characteristics (N=80)

Medical Demographics				
	No.		**%**	
Primary Care Provider at Intake				
Yes	62 (42 males, 20 females)		77.5	
No	18 (16 males, 2 females)		22.5	
Medical Utilization 6 months prior to enrollment in the current study				
	No. of subjects	**%**	**No. of visits**	**%**
Hospitalizations				
Any Kind	24 (20m, 4f)	30	32	100
Medical	3 (2m, 1f)	3.8	3	9.4
Psychiatric	19 (16m, 3f)	23.8	24	75
Substance-Related	2 (2m)	2.5	2	6.3
	Mean		**Range**	
Hospitalization/patient	0.4 (n=80)		0-3	
	No. of subjects	**%**	**No. of visits**	**%**
Emergency Department Visits				
Any Kind	36 (25m, 11f)	45	58	100
Medical	23 (15m, 8f)	28.8	43	74.1
Psychiatric	13 (10m, 3f)	16.3	15	25.9
	Mean		**Range**	
ED visit/patient	0.7 (n=80)		0-4	
	Mean± SD		**Range**	
Time since last PCP visit (days)	210.8±332.1		0-1836	

Table 3

Medical diagnoses (N=80)

Current Medical Diagnoses		
Variables	**No.**	**%**
Cardiovascular	**37**	**46.3**
Hypertension	34 (24 males, 10 females)	42.5
Coronary artery disease	5 (2 males, 3 females)	6.3
Peripheral vascular disease	3 (2 males, 1 female)	3.8
Cardiomyopathy	2 (1 male, 1 female)	2.5
Other	2 (1 male, 1 female)	2.5
Gastrointestinal	**31**	**38.8**
GERD	21 (15 males, 6 females)	26.3
Peptic ulcer disease	5 (3 males, 2 females)	6.3
Alcoholic liver disease	2 (2 males)	2.5
Other	8 (8 males)	10
Musculoskeletal	**25**	**31.3**
Osteoarthritis/deg. joint dis.	17 (12 males, 5 females)	21.3
Degenerative disc disease and chronic low back pain	10 (7 males, 3 females)	12.5
Rheumatoid arthritis	2 (2 females)	2.5
Other	2 (2 males)	2.5
Respiratory	**23**	**28.8**
Asthma	19 (11 males, 8 females)	23.8
COPD	6 (5 males, 1 female)	7.5
Other	3 (3 males)	3.8
Endocrine/metabolism	**23**	**28.8**
Hyperlipidemia	17 (14 males, 3 females)	21.3
Diabetes mellitus type I and II	8 (4 males, 4 females)	10
Hypothyroidism	2 (1 male, 1 female)	2.5
Other	2 (2 males)	2.5
Central nervous system	**11**	**13.8**
Seizure disorder	6 (6 males)	7.5
Headache	3 (2males, 1 female)	3.8
S/p Traumatic brain injury	2 (1 male, 1 female)	2.5
Sensory impairment	**9**	**11.3**
Visual impairment	6 (2 males, 4 females)	7.5
Peripheral neuropathy	3 (3 males)	3.8
Infectious	**8**	**10**
Hepatitis C	5 (3 males, 2 females)	6.3
HIV infection	3 (3 males)	3.8
Autoimmune/hematology	**6**	**7.5**
Anemia	2 (2 males)	2.5
SLE	2 (1 male, 1 female)	2.5

Current Medical Diagnoses		
Variables	**No.**	**%**
Other	2 (2 males)	2.5
Genitourinary	**5**	**6.3**
Chronic renal failure	2 (2 males)	2.5
Other	3 (3 males)	3.8

Table 4

Non-psychiatric Medications (N=80)

Non-psychiatric Medications		
Variables	**No. of patients**	**%**
Antihypertensives	24	30
Analgesics	21	26.3
Antacids	18	22.5
Bronchodilators/inhaled steroids	14	17.5
Lipid lowering drugs	13	16.3
Antidiabetics	9	11.3
Diuretics	9	11.3
Antihistamines	5	6.3
Laxatives/stool softeners	5	6.3
Allergic rhinitis/nasal steroids\	4	5
Antibiotics (including 1 anti-TB)	4	5
Antivirals	2	2.5
Other	8	10

Table 5

Correlation between medical illness burden, demographic variables, and alcohol and substance use (N=80)

	Medical illness burden at baseline					
	CIRS-SA			Charlson comorbidity index		
	R^2=0.408		p=0.042	R^2= 0.380		p=0.000
Variables	**β**	**p**	**sr^2**	**β**	**p**	**sr^2**
Demographics						
Age (years)	0.254	0.218	0.020	0.485	**0.000**	0.198
Sex (male/female)	-0.102	0.439	0.008	-0.098	0.380	0.009
Race (white/other)	0.044	0.751	0.001	-0.125	0.270	0.014
Monthly income	-0.093	0.539	0.005	-0.152	0.220	0.017
Education (years)	-0.137	0.299	0.014	-0.044	0.708	0.002
Employment (yes/no)	-1.128	0.383	0.010	-0.024	0.841	0.000
PCP (yes/no)	0.240	0.059	0.047	0.232	**0.041**	0.049
Number of children	0.002	0.988	0.000	-0.029	0.799	0.001
Addiction severity						
Cocaine use (days/month)	0.235	0.068	0.044	-0.025	0.824	-
Cannabis use (days/month)	0.040	0.753	0.001	-0.097	0.392	-
Smoking (# of cigarettes/week)	0.033	0.793	0.001	-0.033	0.773	-
Alcohol severity						
AST baseline	0.079	0.686	0.002	0.295	**0.010**	-
GGT baseline	0.316	0.100	0.035	0.331	**0.003**	-
Number of drinking days/week	0.075	0.684	0.002	0.073	0.537	-
Number of drinks/week	0.063	0.730	0.002	0.060	0.593	-
ASI alcohol composite score	-0.062	0.688	0.002	0.114	0.318	-
Duration of alcohol problems	-0.028	0.882	0.000	-0.025	0.881	-
Psychosis severity						

	Medical illness burden at baseline					
	CIRS-SA			Charlson comorbidity index		
	R^2=0.408		p=0.042	R^2= 0.380		p=0.000
Variables	**β**	**p**	**sr^2**	**β**	**p**	**sr^2**
PANSS positive	0.139	0.301	-	-0.054	0.632	-
PANSS negative	-0.243	0.089	-	-0.040	0.744	-
PANSS general	0.047	0.725	-	-0.035	0.760	-
No. of psychiatric meds	-0.012	0.920	-	-0.123	0.262	-
No. of psych. hosp.	0.144	0.260	-	0.046	0.677	-
No. of psych. ER visits	0.005	0.974	-	-0.060	0.589	-
GAF score	0.128	0.358	-	0.120	0.327	-
Psychiatric diagnosis*	0.223	0.084	-	0.150	0.182	-
Calgary score	-0.063	0.627	-	0.002	0.986	-
Duration of psych. illness	0.230	0.151	-	0.029	0.827	-
Psych. illness first	0.092	0.498	-	-0.093	0.399	-

* schizophrenia (0) vs. schizoaffective disorder (1)